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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/694,625	10/23/2000	Kiminori Mizuuchi	10873.587US01	9089

23552 7590 04/18/2005

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EXAMINER	
BATTAGLIA, MICHAEL V	

ART UNIT	PAPER NUMBER
2652	

DATE MAILED: 04/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

WM

Office Action Summary	Application No.	Applicant(s)	
	09/694,625	MIZUUCHI ET AL.	
	Examiner	Art Unit	
	Michael V Battaglia	2652	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 February 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9,11-43 and 45-50* is/are pending in the application.

4a) Of the above claim(s) *12-34* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9,35-43 and 46-50* is/are rejected.

7)☒ Claim(s) *11 and 45* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 October 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *13 December 2004*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 13, 2004 has been entered.

Claim Objections

2. Claim 35 and therefore claims 36-43 and 45-50 are objected to because of the following informality. On line 30 of claim 35, replacing "by a distance" with –are separated by a distance–is suggested. The claims will be interpreted as such in the prior art rejections below. Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-4, 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yasuda et al (hereafter Yasuda) (US 6,221,455) in view of Hasman et al (hereafter Hasman) (US 5,526,338).

In regard to claim 1, Yasuda discloses an optical information recording medium (Fig. 5, element 10), with respect to which recording and reproduction are performed with laser beams from one side (Fig. 13), comprising at least two recording layers formed of a phase change material (Fig. 5, elements 11-12) on a substrate (Fig. 5, element 2), wherein the recording layers include a first recording layer (Fig. 5, element 12) and a second recording layer (Fig. 5, element 11) in order from the side on which the laser beams are incident (Fig. 13), the first recording layer is included in a first recording medium (Fig. 5, element 6) and the second recording layer is included in a second recording medium (Fig. 5, element 4), when a wavelength of a first laser beam with which recording and reproduction are performed with respect to the first recording medium is indicated as $\lambda 1$ (nm), a wavelength of a second laser beam with which the second recording medium is recorded and reproduced as $\lambda 2$ (nm), a light absorptance of the first recording layer in a crystal state as Ac (%), a light absorptance of the first recording layer in an amorphous state as Aa (%), a light transmittance of the first recording medium with the first recording layer being in the crystal state as Tc (%), a light transmittance of the first recording medium with the first recording layer being in the amorphous state as Ta (%), and the first recording layer has a light absorption ratio Ac/Aa in a predetermined range with respect to the wavelength $\lambda 1$ (Col. 22, lines 41, 46, and 57-61) and the first recording medium satisfies conditions of $Tc \geq 30$ and $Ta \geq 30$ with respect to the wavelength $\lambda 2$ (Col. 21, lines 42 and 47), wherein the first recording medium and the second recording medium are separated by a distance in the range between $1\mu m$ and $50\mu m$ (Fig. 5, element 5 and Col. 15, lines 58-59). It is noted that in the optical information recording medium of Yasuda, $\lambda 1$ is equal to $\lambda 2$. Yasuda does not disclose that the relationship between the

wavelength $\lambda 1$ and the wavelength $\lambda 2$ is expressed by $10 \leq |\lambda 1 - \lambda 2| \leq 120$. Yasuda also does not disclose that the first recording layer has a thickness of d2 (nm) in a range of $3 \leq d2 \leq 9$.

Yasuda instead discloses that the thickness d2 (nm) of the first recording layer preferably has a range of $10 \leq d2 \leq 30$ (Col. 14, lines 44-48 and 51-52). Yasuda suggests that there are benefits to be derived from keeping the thickness of a recording layer as thin as possible as long as the recording layer is not so thin that the recording layer itself is deteriorated significantly because a thinner recording layer prevents an increased thermal capacity and the tendency to recrystallize (Col. 14, lines 30-43).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the thickness d2 (nm) of the first recording layer of Yasuda to a range of $3 \leq d2 \leq 9$ as long as the recording layer is not so thin that the recording layer itself is deteriorated significantly, the motivation being to prevent an increased thermal capacity and the tendency to recrystallize in the first recording layer of Yasuda. It is noted that while Applicant has provided evidence of the criticality of the thickness d2 (nm) falling in the range of $3 \leq d2 \leq 12$ (Page 19, lines 14-19 of Applicant's specification), no evidence of criticality of the thickness d2 (nm) falling in the range of $3 \leq d2 \leq 9$ has been provided.

Hasman discloses an optical information recording medium, which is recorded and reproduced by laser beams from one side, comprising at least two recording layers formed of a phase change material on a substrate (Col. 8, lines 60-64), wherein the recording layers include a first recording layer and a second recording layer from the side on which the laser beams are incident, the first recording layer is included in a first recording medium and the second recording layer is included in a second recording medium (Fig. 1, element 4), when a wavelength of a first

laser beam with which recording and reproduction are performed with respect to the first recording medium is indicated as $\lambda 1$ (nm) (Fig. 1, element $\lambda 2$), a wavelength of a second laser beam with which the second recording medium is recorded and reproduced as $\lambda 2$ (nm) (Fig. 1, element $\lambda 1$). Hasman further discloses that that the relationship between the wavelength $\lambda 1$ and the wavelength $\lambda 2$ is expressed by $10 \leq |\lambda 1 - \lambda 2| \leq 120$ (Col. 4, lines 49-52). It is noted that Hasman uses laser beams with different wavelengths to enable parallel readout from multiple discs of the optical information recording medium (Col. 2, lines 19-21).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made for the first and second laser beams of Yasuda to have the relationship expressed by $10 \leq |\lambda 1 - \lambda 2| \leq 120$ as suggested by Hasman, the motivation being to enable parallel readout from multiple discs of the optical information recording medium and greatly reduce access time.

In regard to claim 2, Yasuda in view of Hasman as applied to claim 1 meets the further limitations of claim 2. Yasuda discloses the first recording layer has a light absorption ratio Ac/Aa in a predetermined range with respect to the wavelength $\lambda 1$ (Col. 22, lines 41, 46, and 57-61) and the first recording medium satisfies conditions of $Tc \geq 45$ and $Ta \geq 45$ with respect to the wavelength $\lambda 2$ (Col. 21, lines 42 and 47). Hasman discloses a relationship between the wavelength $\lambda 1$ and the wavelength $\lambda 2$ is expressed by $10 \leq |\lambda 1 - \lambda 2| \leq 50$ (Col. 4, lines 49-52).

In regard to claim 3, Yasuda discloses that the optical recording medium further comprises a protective layer (Fig. 5, element 7), wherein the second recording medium (Fig. 5, element 4), the first recording medium (Fig. 5, element 6), and the protective layer (Fig. 5, element 7) are formed on the substrate (Fig. 5, element 2) sequentially, the protective layer has a thickness d1

(um) in a range of $30 \leq d1 \leq 200$ (Col. 6, lines 5-6), and recording and reproduction are performed with the first and second laser beams from a side of the protective layer (Fig. 13).

In regard to claim 4, the first recording medium of Yasuda formed on a first substrate (Fig. 5, element 5) and the second recording medium of Yasuda formed on a second substrate (Fig. 5, element 2) are inherently bonded to each other (Fig. 5 of Yasuda).

In regard to claim 7, Yasuda discloses that a condition of the light absorption ratio $Ac/Aa \geq 1.0$ in the first recording layer is satisfied with respect to the wavelength $\lambda 1$ (nm) of the first laser beam (Col. 22, lines 41, 46).

In regard to claim 8, Yasuda discloses that the first recording layer contains Ge-Sb-Te (Col. 9, line 61-Col. 10, line 9).

4. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yasuda in view of Hasman as applied to claim 1 above, and further in view of Welch et al (hereafter Welch) (US 5,384,797).

Yasuda in view of Hasman discloses the optical information recording medium of claim 1 wherein recording and reproduction are performed with a first laser beam and a second laser beam with different wavelengths. Yasuda in view of Hasman does not disclose that the first laser beam and a second laser beam are emitted from a multiwavelength light source in which a part of an optical waveguide of a second harmonic generation element and an optical waveguide of a semiconductor laser are optically coupled.

Welch discloses a multiwavelength light source (Col. 2, lines 62-63) in which a part of an optical waveguide of a second harmonic generation element (Fig. 1, elements 15 and 23; Col. 6, lines 62-63; and Col. 7, line 63-Col. line 4) and an optical waveguide of a semiconductor laser (Fig.

1, element 19) are optically coupled (Fig. 1). Welch discloses that second-harmonic generation is an efficient way to double frequency, thereby producing laser beams with different wavelengths.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to produce the first and second laser beams for recording and reproducing in the optical information recording medium of Yasuda in view of Hasman with the multiwavelength light source of Welch in which a part of an optical waveguide of a second harmonic generation element and an optical waveguide of a semiconductor laser are optically coupled, the motivation being to efficiently produce multiple wavelengths.

5. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yasuda in view of Hasman as applied to claim 1 above, and in further view of Imaino et al (hereafter Imaino) (US 5,555,537).

Yasuda in view of Hasman discloses an optical information recording medium according to claim 1. Hasman mentions use of a 427nm laser beam (Col. 4, lines 40-46) and teaches that any suitable assembly of light sources may be used (Col. 4, lines 49-50) with the optical information recording medium capable of parallel readout. Yasuda in view of Hasman does not disclose that the wavelength $\lambda 1$ (nm) of the first laser beam is in a range of $390 \leq \lambda 1 \leq 520$.

Imaino suggests use of a laser beam with a wavelength $\lambda 1$ in the range of $390 \leq \lambda 1 \leq 520$ and teaches that recording density is increased by shortening the wavelength of a laser beam, which reduces the spot size of the laser beam (Col. 7, lines 46-50).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to shorten the wavelength $\lambda 1$ of the first laser beam of Yasuda in view of

Hasman to a range of 390≤λ1≤520 as suggested by Imaino, the motivation being to reduce the spot size of the first laser beam and increase the recording density of the first recording medium.

6. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yasuda in view of Hasman as applied to claim 1 above, and further in view of Akahira et al (hereafter Akihira) (US 5,527,661).

Yasuda in view of Hasman discloses an optical information recording medium according to claim 1. Yasuda in view of Hasman does not disclose that the first recording layer contains Ge-Sb-Te-Sn.

Akahira discloses a phase change information layer made of Ge-Sb-Te-Sn and teaches that Ge-Sb-Te-Sn is a chalcogenide compound that will change in structural phase between an amorphous state and a crystalline state (Col. 8, lines 8-14).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use Ge-Sb-Te-Sn for the first recording layer of Yasuda in view of Hasman as suggested by Akahira, the motivation being to use a material that changes structural phase between an amorphous state and a crystalline state to record information.

7. Claims 35-39, 41, 42 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yasuda in view of Hasman and in further view of Welch.

In regard to claim 35, Yasuda discloses an optical system comprising: a focusing optical system (Fig. 13, element 34); and an optical information recording medium (Fig. 5, element 10), with respect to which recording and reproduction are performed with laser beams from one side (Fig. 13), the optical information recording medium including at least two recording layers formed of a phase change material (Fig. 5, elements 11-12) on a substrate (Fig. 5, element 2), in which the

recording layers include a first recording layer (Fig. 5, element 12) and a second recording layer (Fig. 5, element 11) in order from the side on which the laser beams are incident (Fig. 13), the first recording layer is included in a first recording medium (Fig. 5, element 6) and the second recording layer is included in a second recording medium (Fig. 5, element 4), when a wavelength of a first laser beam with which recording and reproduction are performed with respect to the first recording medium is indicated as $\lambda 1$ (nm), a wavelength of a second laser beam with which the second recording medium is recorded and reproduced as $\lambda 2$ (nm), a light absorptance of the first recording layer in a crystal state as Ac (%), a light absorptance of the first recording layer in an amorphous state as Aa (%), a light transmittance of the first recording medium with the first recording layer being in the crystal state as Tc (%), a light transmittance of the first recording medium with the first recording layer being in the amorphous state as Ta (%), and the first recording layer has a light absorption ratio Ac/Aa in a predetermined range with respect to the wavelength $\lambda 1$ (Col. 22, lines 41, 46, and 57-61) and the first recording medium satisfies conditions of $Tc \geq 30$ and $Ta \geq 30$ with respect to the wavelength $\lambda 2$ (Col. 21, lines 42 and 47), and the first recording medium and the second recording medium are separated by a distance in the range between 1μm and 50μm (Fig. 5, element 5 and Col. 15, lines 58-59). It is noted that in the optical information recording medium of Yasuda, $\lambda 1$ is equal to $\lambda 2$. Yasuda does not disclose that the relationship between the wavelength $\lambda 1$ and the wavelength $\lambda 2$ is expressed by $10 \leq |\lambda 1 - \lambda 2| \leq 120$. Yasuda does not disclose a multiwavelength light source nor that the beams from the multiwavelength light source are focused on the optical information recording medium by the focusing optical system. Yasuda also does not disclose that the first recording layer has a thickness of d2 (nm) in a range of $3 \leq d2 \leq 9$.

Yasuda instead discloses that the thickness d2 (nm) of the first recording layer preferably has a range of $10 \leq d2 \leq 30$ (Col. 14, lines 44-48 and 51-52). Yasuda suggests that there are benefits to be derived from keeping the thickness of a recording layer as thin as possible as long as the recording layer is not so thin that the recording layer itself is deteriorated significantly because a thinner recording layer prevents an increased thermal capacity and the tendency to recrystallize (Col. 14, lines 30-43).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the thickness d2 (nm) of the first recording layer of Yasuda to a range of $3 \leq d2 \leq 9$ as long as the recording layer is not so thin that the recording layer itself is deteriorated significantly, the motivation being to prevent an increased thermal capacity and the tendency to recrystallize in the first recording layer of Yasuda. It is noted that while Applicant has provided evidence of the criticality of the thickness d2 (nm) falling in the range of $3 \leq d2 \leq 12$ (Page 19, lines 14-19 of Applicant's specification), no evidence of criticality of the thickness d2 (nm) falling in the range of $3 \leq d2 \leq 9$ has been provided.

Hasman discloses an optical system comprising: a multiwavelength light source (Fig. 9A, LIGHT SOURCE); a focusing optical system (Fig. 9A, element 91); and an optical information recording medium (Fig. 9A, element 92), which is recorded and reproduced by laser beams from one side, comprising at least two recording layers formed of a phase change material on a substrate (Col. 8, lines 60-64), wherein the recording layers include a first recording layer and a second recording layer from the side on which the laser beams are incident, the first recording layer is included in a first recording medium and the second recording layer is included in a second recording medium (Fig. 1, element 4), when a wavelength of a first laser beam with which

recording and reproduction are performed with respect to the first recording medium is indicated as $\lambda 1$ (nm) (Fig. 1, element $\lambda 2$), a wavelength of a second laser beam with which the second recording medium is recorded and reproduced as $\lambda 2$ (nm) (Fig. 1, element $\lambda 1$). Hasman further discloses that the relationship between the wavelength $\lambda 1$ and the wavelength $\lambda 2$ is expressed by $10 \leq |\lambda 1 - \lambda 2| \leq 120$ (Col. 4, lines 49-52). It is noted that Hasman uses laser beams with different wavelengths from the multiwavelength light source and focused on the optical information recording medium by the focusing optical system to enable parallel readout from multiple discs of the optical information recording medium (Col. 2, lines 19-21).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the optical information recording medium of Yasuda with the focusing optical system and multiwavelength light source having first and second laser beams that have the relationship expressed by $10 \leq |\lambda 1 - \lambda 2| \leq 120$ as suggested by Hasman, the motivation being to enable parallel readout from multiple discs of the optical information recording medium and greatly reduce access time. Hasman does not disclose that the multiwavelength light source includes a plurality of coherent light sources with different wavelengths and an optical waveguide device, the optical wave device including a substrate, a plurality of optical waveguides formed in the vicinity of a surface of the substrate, injection parts formed at one end of the optical waveguides, and emission parts formed on the other end of the optical waveguides the plurality of optical waveguides satisfying phase-matching conditions different from one another, the emission parts of the plurality of optical waveguides being provided at substantially the same position, and wavelengths of beams from the coherent light sources being converted by the optical waveguide device.

Welch discloses a multiwavelength light source including a plurality of coherent light sources with different wavelengths (Fig. 1, element 13a) and an optical waveguide device (Fig. 3, elements 23), the optical wave device including a substrate (Fig. 1, element 11), a plurality of optical waveguides formed in the vicinity of a surface of the substrate (Fig. 3, elements 23), injection parts formed at one end of the optical waveguides, and emission parts formed on the other end of the optical waveguides (Fig. 1), the plurality of optical waveguides satisfying phase-matching conditions different from one another (Col. 2, lines 34-36), the emission parts of the plurality of optical waveguides being provided at substantially the same position (Col. 3, lines 13-14), and wavelengths of beams from the coherent light sources being converted by the optical waveguide device (Col. 3, lines 25-29). It is noted that a laser diode is a coherent light source (see Citation of Relevant Prior Art below). The plurality of optical waveguides are interpreted as satisfying phase-matching conditions different from one another because the plurality of optical waveguides each match the phase of a different wavelength. It is further noted that the design of the multiwavelength light source of Welch is compact.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the multiwavelength light source of Hasman in the optical system of Yasuda in view of Hasman with the multiwavelength light source of Welch, the motivation being to use a multiwavelength light source that is more compact.

In regard to claim 36, Yasuda in view of Hasman and in further view of Welch as applied to claim 35 meets the further limitations of claim 36. Yasuda discloses the first recording layer has a light absorption ratio Ac/Aa in a predetermined range with respect to the wavelength $\lambda 1$ (Col. 22, lines 41, 46, and 57-61) and the first recording medium satisfies conditions of $Tc \geq 45$ and $Ta \geq 45$

with respect to the wavelength $\lambda 2$ (Col. 21, lines 42 and 47). Hasman discloses a relationship between the wavelength $\lambda 1$ and the wavelength $\lambda 2$ is expressed by $10 \leq |\lambda 1 - \lambda 2| \leq 50$ (Col. 4, lines 49-52).

In regard to claim 37, Yasuda discloses that in the optical information recording medium, the second recording medium (Fig. 5, element 4), the first recording medium (Fig. 5, element 6), and the protective layer (Fig. 5, element 7) are formed on the substrate (Fig. 5, element 2) sequentially, the protective layer has a thickness d1 (um) in a range of $30 \leq d1 \leq 200$ (Col. 6, lines 5-6), and recording and reproduction are performed with the first and second laser beams from a side of the protective layer (Fig. 13).

In regard to claim 38, in the optical information recording medium of Yasuda, the first recording medium formed on a first substrate (Fig. 5, element 5) and the second recording medium formed on a second substrate (Fig. 5, element 2) are inherently bonded to each other (Fig. 5 of Yasuda).

In regard to claim 39, Yasuda in view of Hasman and further in view of Welch discloses the optical information recording medium of claim 35 wherein recording and reproduction are performed with a first and second laser beams emitted from the multiwavelength source of Welch. Welch discloses that in the multiwavelength light source (Col. 2, lines 62-63), a part of an optical waveguide of a second harmonic generation element (Fig. 1, elements 15 and 23; Col. 6, lines 62-63; and Col. 7, line 63-Col. line 4) and an optical waveguide of a semiconductor laser (Fig. 1, element 19) are optically coupled (Fig. 1).

In regard to claim 41, Yasuda discloses that in the optical information recording medium, a condition of the light absorption ratio Ac/Aa $\geq$1.0 in the first recording layer is satisfied with respect to the wavelength $\lambda 1$ (nm) of the first laser beam (Col. 22, lines 41, 46).

In regard to claim 42, Yasuda discloses that the first recording layer in the optical information recording medium contains Ge-Sb-Te (Col. 9, line 61-Col. 10, line 9).

In regard to claim 46, Hasman discloses that the optical information recording medium is recorded or reproduced simultaneously with beams with a plurality of wavelengths from the multiwavelength source (Col. 2, lines 19-21).

8. Claim 40 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yasuda in view of Hasman and further in view of Welch as applied to claim 35 above, and in further view of Imaino.

Yasuda in view of Hasman and in further view of Welch discloses an optical information recording medium according to claim 35. Hasman mentions use of a 427nm laser beam (Col. 4, lines 40-46) and teaches that any suitable assembly of light sources may be used (Col. 4, lines 49-50) with the optical information recording medium capable of parallel readout. Yasuda in view of Hasman does not disclose that the wavelength $\lambda 1$ (nm) of the first laser beam is in a range of $390 \leq \lambda 1 \leq 520$.

Imaino suggests use of a laser beam with a wavelength $\lambda 1$ in the range of $390 \leq \lambda 1 \leq 520$ and teaches that recording density is increased by shortening the wavelength of a laser beam, which reduces the spot size of the laser beam (Col. 7, lines 46-50).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to shorten the wavelength $\lambda 1$ of the first laser beam of Yasuda in view of Hasman and in further view of Welch to a range of $390 \leq \lambda 1 \leq 520$ as suggested by Imaino, the

motivation being to reduce the spot size of the first laser beam and increase the recording density of the first recording medium.

9. Claim 43 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yasuda in view of Hasman and in further view of Welch as applied to claim 35 above, and further in view of Akahira.

Yasuda in view of Hasman and in further view of Welch discloses an optical information recording medium according to claim 35. Yasuda in view of Hasman and in further view of Welch does not disclose that the first recording layer contains Ge-Sb-Te-Sn.

Akahira discloses a phase change information layer made of Ge-Sb-Te-Sn and teaches that Ge-Sb-Te-Sn is a chalcogenide compound that will change in structural phase between an amorphous state and a crystalline state (Col. 8, lines 8-14).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use Ge-Sb-Te-Sn for the first recording layer of Yasuda in view of Hasman and in further view of Welch as suggested by Akahira, the motivation being to use a material that changes structural phase between an amorphous state and a crystalline state to record information.

10. Claims 47-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yasuda in view of Hasman and in further view of Welch as applied to claim 35 above, and further in view of Takeuchi (US 6,424,608).

In regard to claim 47, Yasuda in view of Hasman and in further view of Welch disclose the optical system of claim 35, wherein the optical information recording medium is recorded and reproduced with laser beams from a multiwavelength light source. Yasuda in view of Hasman and in further view of Welch does not disclose that the optical information recording medium is recorded with at least one beam with a wavelength from the multiwavelength light source and

simultaneously information is detected from the optical information recording medium with a beam with another wavelength from the multiwavelength light source.

Takeuchi discloses recording an optical information recording medium (Fig. 2, element D) with at least one beam with a wavelength (Fig. 3, RECORDING BEAM) and simultaneously detecting information from the optical information recording medium with a beam with another wavelength (Fig. 3, SERVO BEAM; Col. 2, lines 26-30; and Col. 4, lines 33-36). Takeuchi teaches that doing so allows monitoring of a recording state while data is recorded and appropriate adjustment of focusing or intensity (Col. 2, lines 21-30).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to record the optical information recording medium with at least one beam with a wavelength from the multiwavelength light source and simultaneously detect information from the optical information recording medium with a beam with another wavelength from the multiwavelength light source in the optical system of Yasuda in view of Hasman and in further view of Welch as suggested by Takeuchi, the motivation being to enable monitoring of a recording state while data is recorded and appropriate adjustment of focusing or intensity.

In regard to claim 48, Takeuchi discloses that based on signals detected by the beam with another wavelength from the multiwavelength light source, intensity of at least one beam with a wavelength is controlled (Col. 2, lines 26-30). It is noted that in the optical system of Yasuda in view of Hasman and in further view of Welch and in further view of Takeuchi, laser beams are emitted by the multiwavelength light source of Welch.

In regard to claim 49, Takeuchi discloses that based on signals detected by the beam with another wavelength from the multiwavelength light source, a focal point on the optical information recording medium of the at least one beam with a wavelength is controlled (Col. 2, lines 26-30). It

is noted that in the optical system of Yasuda in view of Hasman and in further view of Welch and in further view of Takeuchi, laser beams are emitted by the multiwavelength light source of Welch.

11. Claims 47, 49 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yasuda in view of Hasman and in further view of Welch as applied to claim 35 above, and further in view of Ojima et al (hereafter Ojima) (US 4,908,813).

In regard to claim 47, Yasuda in view of Hasman and in further view of Welch disclose the optical system of claim 35. Yasuda in view of Hasman and in further view of Welch does not disclose that the optical information recording medium is recorded with at least one beam with a wavelength from the multiwavelength light source and simultaneously information is detected from the optical information recording medium with a beam with another wavelength from the multiwavelength light source.

Ojima discloses recording an optical information recording medium (Fig. 2, element 1) with at least one beam with a wavelength (Col. 4, lines 20-25 and Col. 6, lines 34-36) from the multiwavelength light source (Fig. 2, elements 6 and 8) and simultaneously detecting information from the optical information recording medium with a beam with another wavelength from the multiwavelength light source (Col. 4, lines 9-14 and Col. 6, lines 37-40). Ojima teaches that doing so enables automatic focusing through detection of focal point bias (Col. 3, line 60 and Col. 4, line 12).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to record the optical information recording medium with at least one beam with a wavelength from the multiwavelength light source and simultaneously detect information from the optical information recording medium with a beam with another wavelength from the multiwavelength light source in the optical system of Yasuda in view of Hasman and in further view

of Welch as suggested by Ojima, the motivation being to enable automatic focusing through detection of focal point bias.

In regard to claim 49, Ojima discloses that based on signals detected by the beam with another wavelength from the multiwavelength light source, a focal point on the optical information recording medium of the at least one beam with a wavelength is controlled (Col. 3, line 60 and Col. 4, lines 9-14).

In regard to claim 50, Yasuda in view of Hasman and further in view of Welch and further in view of Ojima as applied to claim 47 does not disclose that beams with a plurality of wavelengths from the multiwavelength light source are mixed, with which the optical information recording medium is recorded.

Ojima discloses that beams with a plurality of wavelengths (Fig. 2, elements 51-53) from the multiwavelength light source (Fig. 2, elements 6 and 8) are mixed (Col. 3, lines 21-23), with which the optical information recording medium is recorded (Col. 4, lines 20-23) and teaches that by doing so, the information transfer rate is enhanced (Col. 4, lines 23-25).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to record the optical information recording medium in the optical system of Yasuda in view of Hasman and further in view of Welch and further in view of Ojima as applied to cliam 47 with mixed beams with a plurality of wavelengths from the multiwavelength light source as further suggested by Ojima, the motivation being to enhance the information transfer rate.

Citation of Relevant Prior Art

12. Ishizuka et al (US 5,930,066) discloses that a laser diode is a coherent light source (Col. 4).

Allowable Subject Matter

13. Claim 11 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claim 45 would be allowable if rewritten to overcome the objection(s) set forth in this Office action and to include all of the limitations of the base claim and any intervening claims. In regard to claims 11 and 45, none of the references of record alone or in combination suggest or fairly teach the optical information recording medium including all the limitations of claim 1 or the optical system with an optical information recording medium including all the limitations of claim 35, **wherein the first recording medium includes at least the first recording layer and a reflective layer formed sequentially on the substrate, and the reflective layer has a thickness d3 (nm) in a range of $2 \leq d3 \leq 20$.**

Response to Arguments

14. Applicant's arguments filed December 13, 2004 with respect to Yasuda have been fully considered but they are not persuasive. Yasuda discloses that the thickness d2 (nm) of the first recording layer (Fig. 5, element 12) preferably has a range of $10 \leq d2 \leq 30$ (Col. 14, lines 44-48 and 51-52). Applicant argues that Yasuda does not suggest a criticality in the thickness of the first recording layer or that there is any reason to reduce the thickness of the first recording layer to less than 10nm. However, Yasuda discloses the criticality in the thickness of the first recording layer and the reason to reduce the thickness of the first recording layer is to prevent an increased thermal capacity and therefore prevent a tendency towards recrystallization that deteriorates overwrite characteristics (durability) (Col. 14, lines 30-38). It is noted that while Applicant provides

evidence of the criticality of the thickness d2 (nm) falling in a range of 3≤d2≤12 (Page 19, lines 14-19 of Applicant's specification) that overlaps Yasuda's range, Applicant provides no evidence of criticality of the thickness d2 (nm) falling in the range of 3≤d2≤9. While Yasuda expresses a preference for a thicker layer of 10-30nm, at the same time it provides motivation (ie. preventing a tendency towards recrystallization that deteriorates overwrite characteristics (durability)) for one of ordinary skill in the art to focus on thickness levels at the bottom of Yasuda's range and to explore thickness levels below that range (see *In re Geisler*, 116 F.3d 1465, 1471, 43 USPQ2d 1362, 1366 (Fed. Cir. 1997)). Further, the claimed range and Yasuda's range are close enough (1nm apart) that one skilled in the art would have expected them to have the same properties (see *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985)).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael V Battaglia whose telephone number is (571) 272-7568. The examiner can normally be reached on 5-4/9 Plan with 1st Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T Nguyen can be reached on (571) 272-7579. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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PRIMARY EXAMINER